

R E M A R K S

This is in response to the Office Action that was mailed on March 19, 2004. The definition of the substrate in claim 1 as amended is based upon such disclosure as that appearing in the specification, from line 4 on page 24 through line 8 on page 27. The alcohol, aldehyde, and ketone embodiments of the substrate are defined with reference to: page 28, lines 16-17; page 30, lines 13-14; and page 31, lines 3-4. The types of reaction and species or reactant are amended based upon such disclosure as that appearing in the specification: page 39, lines 16-19; page 42, lines 3-4; and page 43, lines 5-17. New claim 19, which corresponds to claim 1 as amended but without reciting the preferred substrates, is based upon such disclosure as that appearing in lines 20-22 on page 18 of the specification. New claim 20 defines the co-catalyst species, based upon lines 21-26 on page 18 of the specification. Claims 1-3 and 18-20 are in the application.

Claims 1-3 and 18 were rejected under the first and second paragraphs of 35 U.S.C. §112. In order to overcome these grounds of rejection, the reactions and types of reactants have been specified, and the claims have been adjusted to clarify that the process is separation process. It is respectfully submitted that the claims in their present form fully satisfy the statutory requirements.

Claims 1-3 and 18 had been rejected under 35 U.S.C. 102(b) as being anticipated by US 5,030,739 (Foricher).

Foricher discloses a process for the catalytic oxidation of an isoprenoid which has at least one allylic hydrogen atom. The Foricher process comprises oxidizing the isoprenoid with oxygen or a gas which containing oxygen in an inert solvent, in the absence of a basic compound or a compound with an acidic hydrogen and in the presence of an N-hydroxydicarboxylic acid imide of the formula, to produce a hydroperoxide.

Regarding the use of a metal component, Foricher teaches that previously known processes frequently provided low yields and led to ecological damage due to metal salts resulting from their reactions. Moreover, the products of such processes generally contained, undesirably, traces of metal compounds. Column 1, lines 24-29.

Foricher teaches that "isoprenoids which possess a methyl, methylene or methyne group on a C-C double bond are oxidized" (col. 2, lines 39-42) and "The above terms isoprenoid, ... embrace not only hydrocarbons with an isoprenoid structural basis, but also alcohols, aldehydes, ketones and esters derived therefrom." (col. 3, lines 13-16). As the imide, N-hydroxyphthalimide is disclosed (patent claim 7). As the inert solvent, there may be mentioned alkanone, cycloalkanone, or alkylalkanoate with a maximum of 8 carbon atoms (patent claim 8), specifically, methyl isobutyl ketone, acetone, cyclohexanone or ethyl acetate (patent claim 9). Concerning the separation of the catalyst (the N-

hydroxydicarboxylic acid imide), Foricher teaches, at column 4, lines 50-62, as follows:

After the oxidation, the catalyst can be separated from the reaction mixture e.g., with aid of a non-polar solvent, and can be reused. The reaction mixture can be concentrated, then treated with a non-polar solvent and the catalyst can be crystallized-out. The solvent which is used in the oxidation is removed completely by evaporation and the residue is taken up in a non-polar solvent, in which the catalyst remains behind as an insoluble residue. Examples of the non-polar solvents are hydrocarbons and non-polar chlorinated hydrocarbons such as hexane, tetrachloromethane and the like.

Moreover, the oxidation products in Foricher can be separated from the reaction mixture according to known methods (column 5, lines 3-4). If desired, the hydroperoxides obtained can be further reacted to give alcohols or carbonyl compounds (column 5, lines 5-6). The reduction of the hydroperoxides to alcohols can be carried out according to methods known in the art (column 5, lines 9-10). Primary and secondary hydroperoxides can be converted into the corresponding carbonyl compounds by water cleavage (column 5, lines 15-17).

COMPARISON OF THE PRESENT INVENTION TO THE FORICHER DISCLOSURE. Foricher fails to teach or suggest the reaction of a substrate of the type required by claims 1-3 and 18 herein. The special substrates of Foricher, that is, isoprenoids having an allylic hydrogen, have no meaningful relationship – in chemical structure or properties – to the substrates recited in

claims 1-3 and 18 herein. Foricher fails to teach or suggest a combination of an imide catalyst and a metal co-catalyst required by claims 19 and 20 herein. In fact, as noted above, Foricher actually teaches away from the use of metal components. Inasmuch as the present invention differs remarkably from Foricher with respect not only to the substrate but also to reaction mechanisms, the present invention is both novel and unobvious over the Foricher disclosure.

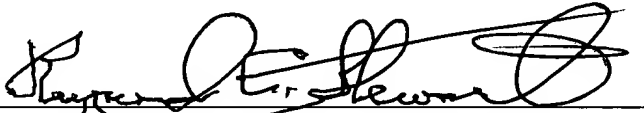
UNEXPECTED BENEFITS. Moreover, the present invention provides unexpected advantages. As is apparent from the description "the allylic oxidation of isoprenoids ... leads to hydroperoxides" (column 4, lines 63-64), the oxidation product of the Foricher substrate needs further reduction or water cleavage of hydroperoxide to give a useful or final product, such as alcohols, ketones, or acids. In contrast, as is apparent from the Examples herein, alcohols, ketones, or acids are directly formed by a single reaction in the present invention. This constitutes further evidence that the presently claimed invention is both novel and unobvious over Foricher.


The Examiner is invited to contact Richard Gallagher (Reg. No. 28,781) at (703) 205-8008 with any questions.

If necessary, the Commissioner is hereby authorized in this, concurrent, and further replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fee required under 37 CFR 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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